Electronic Version
Stylesheet Version v1.1.1

Claims

[c1] What is claimed is:

1. A lead type light emitting diode package comprising:
a light emitting diode device disposed in the lead type light emitting diode package; and
a molding material covering the light emitting diode device, a plurality of scatter supported wavelength converters being included in the molding material;
wherein portions of light beams emitted from the light emitting diode device incident to each of the scatter supported wavelength converters are scattered by each of the scatter supported wavelength converters, and portions of light beams emitted from the light emitting diode device incident to each of the scatter supported wavelength converters are absorbed to excite each of the scatter supported wavelength converters to emit light in another wavelength.

[c2] 2. The lead type light emitting diode package of claim 1 wherein the molding material comprises an organic molding compound, a ceramic material permeable to light, a glass material permeable to light, an insulation fluid material permeable to light, or a composite material

comprising at least two materials selected from a group consisting of the above-mentioned materials.

[c3] 3. The lead type light emitting diode package of claim 1 wherein each of the scatter supported wavelength converters comprises a physical composite material or a chemical composite material, and each of the scatter supported wavelength converters comprises at least one scatterer and at least one activator.

[c4] 4. The lead type light emitting diode package of claim 3 wherein the activator is a material represented by a general formula $(A)_{3+t+u}(B)_{5+u+2v}(C)_{12+2t+3u+3v}$:D, where $0<t<5$, $0<u<15$, $0<v<9$, A is at least one selected from Y, Ce, Tb, Gd, and Sc, B is at least one selected from Al, Ga, Tl, In, and B, C is at least one selected from O, S, and Se, D is at least one selected from Ce and Tb, and the scatterer comprises an oxide, a sulphuret, or a selenium compound of at least one metal element selected from the above general formula.

[c5] 5. The lead type light emitting diode package of claim 3 wherein the activator adheres to portions of a surface of the scatterer.

[c6] 6. The lead type light emitting diode package of claim 3 wherein the scatterer is encapsulated by the activator.

[c7] 7. The lead type light emitting diode package of claim 3 wherein the activator is spread in the scatterer.

[c8] 8. The lead type light emitting diode package of claim 1 wherein the light emitting diode device is a light emitting diode chip, and the lead type light emitting diode package further comprises a diode chip anti in parallel with the light emitting diode chip.

[c9] 9. The lead type light emitting diode package of claim 1 wherein the light emitting diode device is adhered to a high reflectivity surface in the lead type light emitting diode package by a non-conductive adhesive permeable to light.

[c10] 10. The lead type light emitting diode package of claim 1 further comprising a first lead used as a positive electrode and a second lead used as a negative electrode.

[c11] 11. The lead type light emitting diode package of claim 10 wherein one of the first lead and the second lead comprises a cup.

[c12] 12. A chip type light emitting diode package comprising:
a casing comprising a recess;
a light emitting diode device disposed in the recess; and
a molding material filling the recess and covering the

light emitting diode device, a plurality of scatter supported wavelength converters being included in the molding material;

wherein portions of light beams emitted from the light emitting diode device incident to each of the scatter supported wavelength converters are scattered by each of the scatter supported wavelength converters, and portions of light beams emitted from the light emitting diode device incident to each of the scatter supported wavelength converters are absorbed to excite each of the scatter supported wavelength converters to emit light in another wavelength.

[c13] 13. The chip type light emitting diode package of claim 12 wherein the molding material comprises an organic molding compound, a ceramic material permeable to light, a glass material permeable to light, an insulation fluid material permeable to light, or a composite material comprising at least two materials selected from a group consisting of the above-mentioned materials.

[c14] 14. The chip type light emitting diode package of claim 12 wherein each of the scatter supported wavelength converters comprises a physical composite material or a chemical composite material, and each of the scatter supported wavelength converters comprises at least one scatterer and at least one activator.

[c15] 15. The chip type light emitting diode package of claim 14 wherein the activator is a material represented by a general formula $(A)_{3+t+u}(B)_{5+u+2v}(C)_{12+2t+3u+3v}$:D, where $0<t<5$, $0<u<15$, $0<v<9$, A is at least one selected from Y, Ce, Tb, Gd, and Sc, B is at least one selected from Al, Ga, Tl, In, and B, C is at least one selected from O, S, and Se, D is at least one selected from Ce and Tb, and the scatterer comprises an oxide, a sulphuret, or a selenium compound of at least one metal element selected from the above general formula.

[c16] 16. The chip type light emitting diode package of claim 14 wherein the activator adheres to portions of a surface of the scatterer.

[c17] 17. The chip type light emitting diode package of claim 14 wherein the scatterer is encapsulated by the activator.

[c18] 18. The chip type light emitting diode package of claim 14 wherein the activator is spread in the scatterer.

[c19] 19. The chip type light emitting diode package of claim 12 wherein the light emitting diode device is a light emitting diode chip, and the chip type light emitting diode package further comprises a diode chip anti in parallel with the light emitting diode chip.

[c20] 20. The chip type light emitting diode package of claim 12 wherein the light emitting diode device is adhered to a high reflectivity surface in the chip type light emitting diode package by a non-conductive adhesive permeable to light.

[c21] 21. The chip type light emitting diode package of claim 12 further comprising a positive electrode and a negative electrode in the case.